DOCUMENT RESUME

ED 441 019 TM 030 817

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TITLE Performance Assessment on a Platter--But Will Teachers Partake?
PUB DATE 2000-04-25
NOTE 16p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 24-28, 2000).
PUB TYPE Reports - Evaluative (142) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Case Studies; Computer Assisted Instruction; Elementary Secondary Education; *Online Systems; *Performance Based Assessment; Resources; Science Education; *Science Tests; *Teacher Attitudes; Teacher Surveys; *Teachers; Urban Schools

ABSTRACT

Performance Assessment in Learning Science (PALS) is an on-line (http://www.ctl.sri.com/pals), standards-based, continually updated resource bank of science performance assessment tasks. This paper presents a case study of an urban school district that had an opportunity to access the PALS Web site during the 1999-2000 school year. It details what worked and what did not, and why. The school district comprises 35 schools, kindergarten through high school. About 52% of students live below the poverty level. Teachers from the early grades participated in the case study, with PALS to be introduced at upper grades over the next few years. The district has been implementing Living in the New Computer Oriented Learning 'Nvironment (Project LINCOL'N) for the past 5 years, and the successful use of this project supports science education in the district. After initial enthusiasm, there seemed to be a decline in the use of PALS by teachers, who felt that they did not have the time and patience to go through the necessary searches. Teachers did like the PALS site because it emulates the classic approach of gathering data, making observations, solving a problem, and writing a conclusion. One conclusion from the PALS experience is that district users have to avoid the temptation to use a passive presentation approach. Recommendations are made for improving access to the PALS site and site organization. (SLD)

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ED 441 019

Performance Assessment on a Platter—But Will Teachers Partake?

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American Education Research Association
New Orleans
April 25, 2000

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Performance Assessment on a Platter—But will Teachers Partake?

PALS (Performance Assessment in Learning Science) is an on-line (http://www.ctl.sri.com/pals/) standards-based, continually updated resource bank of science performance assessment tasks. PALS was founded on the premise that teachers will use well-developed performance assessments, especially if they are connected to standards. These could be the standards developed by national organizations (National Science Education Standards), individual states or even school districts. The point is that PALS was developed to fulfill a need that teachers, curriculum staff and assessment directors have been concerned about for years.

The heart of this PALS system includes the performance tasks collected from numerous state and national sources. These are not isolated student problems but rather a complex combination of student directions and response forms, administration procedures, scoring rubrics, examples of student work, and technical quality statistics calculated from field-testing. On-line rater training packets have also been created for some tasks.

Features of the Tasks Section of the PALS site include:

1. Clear assessment targets that provide descriptions of specific achievement expectations.
2. A focused purpose that clarifies the intended uses of the assessment results by teachers, curriculum developers, and policymakers.
3. Use of an assessment method that matches performance goals.

4. A representative sample of science performance tasks that teachers can use across grades to evaluate student knowledge.

5. A way to produce evaluation results of maximum quality at minimum cost in time and effort.

6. Accurate assessments free of bias.

This paper is a case study of one urban district that had an opportunity to access this PALS site during the 1999-2000 school year. It details what worked and what did not and why. It also includes some recommendations from teachers about future improvements.

The site of this study is a kindergarten through high school district in the mid-west of approximately 15,000 students located in 35 schools. Demographically, its percent of students living below the poverty level has increased 11% over the past four years to 52% while the State's percentage increased only 4% for a total of 36%. The district's mobility rate is 34% or almost twice as high as the State's average mobility rate of 18%.

Some additional information about the district is necessary. The superintendent and local Board of Education realized several years ago that a laissez-faire approach to curriculum and instruction would yield laissez-faire achievement results. Therefore, while the State Board of Education generated a series of learning standards and benchmarks that crossed a span of grades, the district staff fine-tuned this effort by developing standards and benchmarks at each grade level through eighth grade and for each course at high school. Subsequently, staff are developing a "body of knowledge" to help explain and guide each

teacher in understanding what the standards and benchmarks really mean in standards based classrooms. The next step is to develop performance tasks as part of an assessment strategy to evaluate student progress. Given this curriculum approach, PALS would seem to be an excellent fit.

In addition, this district has had a Project LINCOL'N (Living In the New Computer Oriented Learning 'Nvironment) for the last five years. The Project's purposes are to:

- Promote science literacy by empowering differently abled learners to utilize a variety of technologies in an integrated, science-anchored curriculum
- Restructure the year-long curriculum into thematic units anchored in science
- Allow students to use the scientific method in inquiry-based experiences
- Use mathematical and technological tools to research, explore and present newly constructed knowledge in authentic applications
- Involve all students, including those with handicapping conditions, as interactive learners using multimedia technologies in cooperative groups facilitated by teachers
- Enhance learning though parental involvement and extension of access to technology beyond the school day
- Require students to apply knowledge and skills from all areas of the curriculum through culminating projects that focus on collaborative problem solving.

A variety of technologies and multimedia are used by and with the students in a cooperative learning environment. Academic growth is documented through individual portfolios.

One subsequent outcome of Project LINCOL'N has been the purchase and use of the FOSS science kits from kindergarten through fifth grade. This approach emphasizes the

use of a thematic approach in science and kits for instruction instead of forcing both the teachers and students to be bound by the use of a single textbook.

Two years ago staff requested an evaluation of Project LINCOL'N to ascertain its long-term effects. Unfortunately, since this was an historical study, the recently developed PALS site was not accessible for this evaluation as an assessment resource. Therefore, the State test and a publisher's multiple-choice test (mathematics and science sub-tests) were used over the objections of participating teachers. It was the program teachers' belief that since their instructional approach emphasized a student's ability to develop projects and solve complex problems, all multiple choice tests were not considered "authentic" enough to be valid measures. However, the results did show that while using two cohorts of students and two different science and mathematics tests over five years, that students who had gone through Project LINCOL'N surpassed their peers in the district and state as well as in national comparisons.

The PALS site was first introduced to staff during a special training program funded via Goals 2000 funds during the summer of 1999. While originally Project LINCOL'N was located only in the Lincoln School fifth and sixth grade center, soon its philosophy had spread to other schools and other grade levels in the district. The necessary training for other district staff was best handled via a six-week summer training session. (A special one-week course for teams from other schools districts to undergo a mini version of this training has been funded by the State for several years.)

During this 1999 summer training a number of teachers—both elementary and high school--were exposed to PALS and given a chance to access tasks. Their immediate reaction was that the site gave them access to a variety and breadth of performance assessment tasks, scoring rubrics and other materials that they had never seen before. The philosophy of the site matched perfectly with their philosophy of instruction, especially since the development and use of rubrics had always been part of the summer training.

Before the follow-up of these teachers during the school year is discussed, it should be noted that the use of PALS as a staff development tool during the district's emerging standards training program was proposed. District administrators decided that if the district was really going to be standards based, all teachers would undergo a training program that would assist them in focussing on the standards and benchmarks in their classrooms. All kindergarten through third grade teachers had to be involved in this first year since a voluntary training program usually taps the same few hardy souls each year. The district's standards coordinator was a former middle school science teacher and a PALS advocate so the addition of PALS to the four-day training program was a serious consideration. The teachers from several schools and their principals would attend two separate two-day sessions about a month apart.

However, it was decided to make PALS a serious part of the 2000-2001 school year training when all the fourth through eighth grade teachers would be involved. A review of the PALS tasks did not provide many examples for teachers of students below fourth

grade. Instead, during the 1999-2000 school year, teachers in the younger grades were exposed to the potential of PALS. The training staff themselves and a number of science teachers throughout the district were involved in the review and reactions to PALS that are noted below. At the conclusion of the training next year and the following year (when all the high school teachers go through the district's training process), a rich source of analyses should be available.

In preparation for all these training sessions, each learning standard (including science) was placed on a matrix with grades from kindergarten through eighth grade and by course at high school. In the cells of these matrices are the assessments that measure student progress. So at a glance, one could see where there were holes either in instructional coverage of the standards or in their assessment. The plan is to encourage teachers to see how PALS tasks help close many assessment gaps.

An additional note. Since PALS depends upon Internet access, it is critical to determine how easily teachers can find and use a computer with an Internet connection within their buildings. During this school year, the district's last building will receive its fiber optic wiring so each classroom will have high speed Internet access. By the start of the 2000-01 school year, each teacher will have a computer available for his or her own use (wired to the Internet via a fiber optic connection). Four different levels of training are occurring this year so the teachers in each building will feel comfortable using the computer and "surfing the web" to find and access sites such as PALS. Stiggins, King, Fullan and others have long talked about the importance of teachers being assessment

literate but at the same time we have to provide the training and opportunities to make them computer literate if they are to partake of the advantages of sites such as PALS.

The above paragraphs have set the context for looking at the effect of PALS during the first half of the 1999-2000 school year in one mid-west urban district. The rest of the paper will detail the results of interviews, observations and questionnaires that were completed by a number of district teachers.

Regardless of grade level, all teachers are positive about the potential of PALS. They had not previously been exposed to a resource that gave them the entire picture—student directions, rubrics and student work samples along with the relevant performance task. However, many teachers stated that generally they neither had the time nor the interest in reviewing the "technical quality" of the tasks. But some obviously did because a few noted that there were tasks with missing information in this category.

After the initial enthusiasm, there seemed to be a decline in the use of the PALS site by teachers. They said that they did not like to go through extensive searches. Teachers felt that they did not have the time or the patience to do the necessary searches. They did not want to loiter at the site; rather they wanted to quickly enter and leave. One recommendation to speed up the search would be to organize the PALS content by headings such as Magnets with the appropriate tasks grouped under it.

Other suggestions included quicker access. For example, if teachers are presenting a unit on "insects" between kindergarten and fourth grade, ideally they should be able to type that word in and then be directed immediately to any PALS tasks in which the word "insects" is used as part of the problem. This was especially relevant to these teachers' needs because of the use of the FOSS curriculum which is centered on specific themes. Teachers also recommended that PALS tasks that can be directly linked to FOSS units should somehow be noted—especially when some tasks call for materials that are already part of the FOSS kits. A number of teachers stated that if the PALS tasks were pre-aligned by FOSS module, they would be more motivated to use the PALS site as a resource.

Teachers liked the PALS site because it emulates the classic approach of gathering data, making observations, solving a problem and writing a conclusion. "Follow Those Tracks" is an example of a fourth grade life science task (contributed by the New York State Department of Education) that teachers liked because of the possibility of multiple right answers.

> Follow Those Tracks. Observe a picture containing patterns of animal tracks, infer what might have happened based upon the pattern of tracks, and write a story describing what might have happened.

"Creative or alternative interpretations" of what happened to the animals whose tracks were found in the snow can be scored as correct. "Scorers should be open to these possibilities and not penalize student responses." Teachers believed that such a problem correctly encourages students to consider alternative right solutions.

Several fourth grade teachers mentioned the example of Making Marbles as an excellent task that kept their students engaged. This performance task was contributed by the Council of Chief State School Officers (CCSSO/SCASS)

> Students study 3 marbles of different sizes. They make observations and measurements, organize their data, and design an experiment to answer questions. The accompanying scenario states: Super Toys is a company that manufactures toys. The company has been making only the middle-sized marbles you see on your plate. Marbles are made by pouring melted glass into molds. The company melts enough glass in each container to make 100 middle-sized marbles each time. How many small marbles can be made from one container of glass? How many large marbles can be made from one container of glass? Students are told they may use whatever equipment (from a variety of measuring equipment provided on their table) to do experiments to help answer the questions. This task is designed to take students approximately 45 minutes to complete.

Overall Task Content Area: Physical Science

Specific Knowledge Areas: Properties of objects and materials

Performance Expectations for the students include:

- conducting investigations
- using equipment
- gathering, organizing, and representing data
- formulating conclusions from investigational data
- applying scientific principles to develop explanations and solve new problems

Teachers found this task by going to the section of PALS where they could access different sets of content standards, including Illinois. They first chose which Illinois Learning Standard (ILS) in Science that they wished to use and the appropriate grade

range (k-4). In this case they chose: State Goal 11 (from ILS): Understand the processes of scientific inquiry and technological design, to investigate questions, conduct experiments and solve problems. The first benchmark under this goal states: Know and apply the concepts, principles and processes of scientific inquiry (11.A). Under this the teacher can check which one of these statements that matches her plans. The two learning outcomes that were chosen from this following list are in italics.

- Describe an observed event (11.A.1a)
- Develop questions on scientific topics (11.A.1b)
- Collect data for investigations using measuring instruments and technologies (11.A.1c)
- *Record and store data using available technologies (11.A.1d)*
- *Arrange data into logical patterns and describe the patterns (11.A.1e)*
- Compare observations of individual and group results (11.A.1f)
- Formulate questions on a specific science topic and choose the steps needed to answer the questions (11.A.2a)
- Collect data for investigations using scientific process skills including observing, estimating and measuring (11.A.2b)
- Construct charts and visualizations to display data (11.A.2c)
- Use data to produce reasonable explanations (11.A.2d)
- Report and display the results of individual and group investigations (11.A.2e)

The teachers noted which ones they wished to conduct further study on and selected the "Show Assessment Chart" button. That action produced a chart with the two above checked statements in the left hand column and a matrix going to the right listing 27 different possible performance tasks that could be used, including eleven that could be used to measure both student learning outcomes. That matrix also appears as a list that the teacher can then check to access all the particular information about this task. In this case the task was the Making Marbles performance task.

Teachers liked the opportunity to search by Illinois standard, such as in the example in the previous paragraphs. They also were positive about the idea that tasks are cross-referenced when they fit multiple standards. However, those teachers who are familiar with the Illinois Learning Standards would like the ability to search by standard from the beginning page. They recommended a pull down window that would appear on the PALS opening page so they would not have to weave their way through the site.

Fullan has stated that "...the more powerful technology becomes, the more indispensable good teachers are. Technology generates a glut of information, but it has no particular pedagogical wisdom." One of our conclusions from the PALS experience this year is that district users have to avoid the temptation to use a passive presentation approach. To those who have long sought this kind of resource, it seems quite clear how the site can become an integral part of classroom assessment for teachers. However, our experience has shown us that:

- We have to help teachers focus on making the connections between PALS and our own district standards, assessment strategy, reporting assessment results, curriculum and school improvement planning.
- We have to continue to ensure that the teachers feel comfortable using their computers to access and use sites such as PALS. There is an apparent contradiction between those staff who want to quickly move into the site grab the needed resource and retreat and those staff with training responsibilities. The latter believe that PALS is a great site since it "...provided examples of good and bad rubrics as tools to guide teachers in creating their own rubrics...that teachers can gain a variety of skills while exploring PALS' databases, including illustrative examples of how to use a rubric to improve their own consistency in scoring performance assessments."
- We will directly link our new district assessment page to PALS along with recommendations about how our staff can best use the site.
- We will develop a strategy this summer to provide follow-up training in their schools to staff who went through the first year of district standards training and we will incorporate PALS as an integral component of the training for the district's grade four through eighth grade teachers next year.

We recommend that PALS developers:

- Develop the capacity to do a word search to identify tasks with grade level combinations. Perhaps an increased number of teachers can be enticed to explore PALS more thoroughly and more often with a few quick successes.
- Display a button on the first page than enables one to search the tasks by national or state standard. Again, such a short cut may encourage more participation.

- Some of the original performance tasks included lessons (e.g., how airplanes fly for middle school students) that also could be an excellent resource to encourage more teacher participation. Can these be found and included?
- Investigate the possibility of tying the performance tasks to curriculum such as FOSS just as they are tied to some state as well as national standards.
- Continue to lobby for funds to develop a site for the Performance Assessment for Learning Mathematics.

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